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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/058,638	01/28/2002	Benjamin P. Olding	M-12339 US	3448

32566 7590 08/31/2006

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EXAMINER

VIEAUX, GARY

ART UNIT PAPER NUMBER

2622

DATE MAILED: 08/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No. 10/058,638	Applicant(s) OLDING ET AL.	
	Examiner Gary C. Vieaux	Art Unit 2622	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-31 is/are pending in the application.
- 4a) Of the above claim(s) 26-31 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 9, 10, 12, 14-18 and 21-24 is/are rejected.
- 7) ☒ Claim(s) 7, 8, 11, 13, 19, 20 and 25 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

This is a first office action in response to application 10/058,638 filed on January 28, 2002 in which claims 1-25 are presented for examination.

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#### ***Election/Restrictions***

Applicant's response to the Restriction Requirement of July 27, 2006, has been received and made of record. Election was made in relation to Invention I, as applied to by claims 1-25. Because applicant did not distinctly and specifically point out supposed errors in the restriction requirement, the election has been treated as an election without  
10 traverse (MPEP §818.03(a)).

#### ***Drawings***

**Figures 1-3** should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in  
15 compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office  
20 action. The objection to the drawings will not be held in abeyance.

### ***Specification - Title***

Based on the foregoing election, the title of the invention is no longer descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

5

### ***Claim Objections***

**Claims 10 and 11** are objected to because of the following informalities:

Regarding claim 10, please change "... has a spectral response representative of a spectral response of said transmissive filter of said first type and a spectral response of said transmissive filter of said second type" to read "... has a spectral response representative of a spectral response of said transmissive filter of said first type and a spectral response representative of a spectral response of said transmissive filter of said second type" in order to create clarity and avoid indefiniteness.

Regarding claim 11, please change "a first set of pixel element" to "a first set of pixel elements" to create correct continuity regarding plurality.

### ***Claim Rejections***

#### ***Claim Rejections - 35 USC § 112***

The following is a quotation of the first paragraph of 35 U.S.C. 112:

20 The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

**Claims 12 and 14** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Regarding claim 12, after review of the specification, subject matter was not found which would fully support the limitations of “a second set of pixel elements, said first color spectrum comprises a cyan color and said second color spectrum comprises a magenta color.” However, the Examiner does note that both figure 3 and lines 14-23 of page 3 support the unclaimed combination of “a first set of pixel element, said first color spectrum comprises a *yellow* color and said second color spectrum comprises a *green* color”, in combination with the limitations found within claim 12, which includes “a second set of pixel elements, said first color spectrum comprises a *cyan* color and said second color spectrum comprises a *magenta* color.” (Emphasis added by Examiner.)

Regarding claim 14, after review of the specification, subject matter was not found which would fully support the limitations of “a second set of pixel elements, said first color spectrum comprises a yellow color and said second color spectrum comprises a green color.” However, the Examiner does note that both figure 3 and lines 14-23 of page 3 support the unclaimed combination of “a first set of pixel element, said first color spectrum comprises a *cyan* color and said second color spectrum comprises a *magenta* color”, in combination with the limitations found within claim 14, which includes “a

second set of pixel elements, said first color spectrum comprises a *yellow* color and said second color spectrum comprises a *green* color. (Emphasis added by Examiner.)

***Claim Rejections - 35 USC § 102***

5 (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

**Claims 1, 5-6, and 9-10** are rejected under 35 U.S.C. 102(b) as being

10 anticipated by Watanabe (US 5,703,641.)

Regarding claim 1, Watanabe discloses an image sensor comprising a two-dimensional array of pixel elements (fig. 8), said array of pixel elements outputting pixel data representing an image of a scene (col. 12 lines 47-48) and a two-dimensional array of selectively transmissive filters superimposed on said two-dimensional array of pixel elements (fig. 8), whereby each pixel element in said array of pixel elements is disposed to capture a first and a second color spectra of visible light (col. 13 lines 29-67.)

Regarding claim 5, Watanabe teaches all of the limitations of claim 5 (see the 102(b) rejection to claim 1 supra) including teaching wherein each of said pixel elements in said array is overlaid with a transmissive filter of a first type and a transmissive filter of a second type (figs. 8 and 9.)

Regarding claim 6, Watanabe teaches all of the limitations of claim 6 (see the 102(b) rejection to claim 5 supra) including teaching wherein said two-dimensional array of transmissive filters is in offset registration with said two-dimensional array of pixel elements so that each filter overlies a portion of an active area of each of two adjacent pixel elements (figs. 8 and 9.)

Regarding claim 9, Watanabe teaches all of the limitations of claim 9 (see the 102(b) rejection to claim 1 supra) including teaching wherein said array of transmissive filters is in registration with each of said pixel elements and each filter in said array of selectively transmissive filters is disposed to transmit visible light of said first color spectrum and visible light of said second color spectrum (figs. 8 and 9.)

Regarding claim 10, Watanabe teaches all of the limitations of claim 10 (see the 102(b) rejection to claim 9 supra) including teaching wherein each filter in said array of transmissive filters has a spectral response representative of a spectral response of said transmissive filter of said first type and a spectral response of said transmissive filter of said second type (figs. 8 and 9.)

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 2-3, 15-18, and 21-24** are rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 5,703,641) in view of Fowler et al. (US 5,461,425.)

Regarding claim 2, Watanabe teaches all of the limitations of claim 2 (see the 102(b) rejection to claim 1 supra) except wherein said two-dimensional array of pixel elements comprises a two-dimensional sensor array of digital pixels, each of said digital pixels outputting digital signals as pixel data.

Nevertheless, Fowler teaches a two-dimensional sensor array of digital pixels, each of said digital pixels outputting digital signals as pixel data (figs. 1 and 2, col. 2 lines 47-54.) It would have been obvious to one of ordinary skill in the art to combine the digital pixel array as taught by Fowler with the filters as taught by Watanabe in order.

5 to create a low-power consuming image sensor that can generate a brightness signal having color components in a predetermined ratio for producing predetermined color picture information ('641 – col. 3 lines 48-56.)

Regarding claim 3, Watanabe and Fowler disclose all of the limitations of claim 3 (see the 103(a) rejection to claim 2 supra) including wherein each of said digital pixels  
10 comprises a photodetector generating an output signal ('425 – fig. 2, col. 2 lines 47-54), and said image sensor further comprises a plurality of analog-to-digital conversion (ADC) circuits located within said array of pixel elements, each of said ADC circuits being connected to one or more photodetectors for converting said output signal digitized pixel voltage signal ('425 – figs. 1 and 2, col. 2 lines 47-54.)

15 Regarding claim 15, although the wording is different, the material is considered substantively equivalent to claim 2, as discussed above.

Regarding claim 16, Watanabe and Fowler disclose all of the limitations of claim 16 (see the 103(a) rejections to claims 2 and 15 supra) including wherein each of said pixel elements comprises a photodetector generating an output signal ('425 – fig. 2, col.  
20 2 lines 47-54), and said image sensor further comprises a plurality of analog-to-digital conversion (ADC) circuits located within said sensor array, each of said ADC circuits



Art Unit: 2622

being connected to one or more photodetectors for converting said output signal digitized pixel voltage signal ('425 – figs. 1 and 2, col. 2 lines 47-54.)

Regarding claim 17, Watanabe and Fowler disclose all of the limitations of claim 17 (see the 103(a) rejections to claims 2 and 15 supra) including wherein each of said pixel elements in said array is overlaid with a transmissive filter of a first type and a transmissive filter of a second type ('641 – figs. 8 and 9.)

Regarding claim 18, Watanabe and Fowler disclose all of the limitations of claim 18 (see the 103(a) rejections to claim 17 supra) including wherein said two-dimensional array of transmissive filters is in offset registration with said two-dimensional array of pixel elements so that each filter overlies a portion of an active area of each of two adjacent pixel elements ('641 – figs. 8 and 9.)

Regarding claim 21, Watanabe and Fowler disclose all of the limitations of claim 21 (see the 103(a) rejections to claims 2 and 15 supra) including wherein said array of transmissive filters is in registration with each of said pixel elements and each filter in said array of selectively transmissive filters is disposed to transmit visible light of said first color spectrum and visible light of said second color spectrum ('641 – figs. 8 and 9.)

Regarding claims 22-24, although the wording is different, the material is considered substantively equivalent to claims 1-2, 4, respectively, as discussed.

**Claim 4** is rejected under 35 U.S.C. 103(a) as being unpatentable over Watanabe (US 5,703,641) in view of Examiner's Official Notice.

Regarding claim 4, Watanabe teaches all of the limitations of claim 4 (see the 102(b) rejection to claim 1 supra) except for disclosing wherein each of said pixel elements of said image sensor generates analog signals representative of said image as pixel data, and said image sensor further comprises an analog-to-digital converter for digitizing said analog signals. However, Watanabe does disclose the image sensor being a full-frame type CCD solid-state image sensor (col. 12 lines 47-50.)

Nevertheless, Official Notice is taken regarding the generation of analog signals from pixel elements in a full-frame type CCD image sensor, as well as the inclusion of analog-to-digital converters with the image sensor for digitizing said analog signals; practices and concepts that are well known and accepted in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to take the analog signals generated by the full-frame type CCD image sensor and convert them to digital signals for the purpose of digital image processing and digital image storage.

#### ***Allowable Subject Matter***

**Claims 7-8, 11, 13, 19-20, and 25** are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

Regarding claims 7-8, 19-20, and 25, the prior art is not found to teach or fairly suggest, in combination with the claims from which dependence is derived, an image

sensor wherein said two-dimensional array of transmissive filters comprises a two-dimensional array of filter cells, each filter cell superimposed and in registration with each of said pixel elements, each of said filter cells comprising a transmissive filter of a first type and a transmissive filter of a second type formed as four quadrants in an active  
5 area of said filter cell.

Regarding claim 11, the prior art is not found to teach or fairly suggest, in combination with the claims from which dependence is derived, an image sensor wherein said array of transmissive filter comprises a CMYG (cyan, magenta, yellow, green) filter pattern and in a first set of pixel element, said first color spectrum  
10 comprises a cyan color and said second color spectrum comprises a green color.

Regarding claim 13, the prior art is not found to teach or fairly suggest, in combination with the claims from which dependence is derived, an image sensor wherein in a second set of pixel elements, said first color spectrum comprises a yellow color and said second color spectrum comprises a magenta color.

15

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Shibazaki et al. (US 5,548,333) discloses pixels that capture both a first and a  
20 second color spectra, resulting in color mixing.

Fossum et al. (US 6,137,100) discloses pixels with multiple filters.

**Contact**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gary C. Vieaux whose telephone number is 571-272-7318. The examiner can normally be reached on Monday - Friday, 8:00am - 4:00pm.


5 If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, NgocYen T. Vu can be reached on 571-272-7320. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for  
10 published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a  
15 USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gary C. Vieaux  
Examiner  
Art Unit 2622

Gcv2

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SUPERVISORY PATENT EXAMINER